Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 15	)	
of the Commission's Rules	)	ET Docket No. 94-124
To Permit Use of Radio	)	RM-8308
Frequencies Above 40 GHz	)	
for New Radio Applications	)	

REPLY COMMENTS

AT&T Corp. ("AT&T") respectfully submits the following reply comments in response to the Commission's Notice of Proposed Rulemaking ("NPRM"), FCC 94-273, released November 8, 1994, proposing to open some radio spectrum above 40 GHz (called millimeter wave frequencies) to commercial use.

AT&T supported the proposal in the NPRM to make the 40.5-42.5 GHz band available for licensed services, but opposes other commenters' proposals to allocate that band to specific such services. AT&T supports the suggestion of several commenters that additional millimeter wave frequencies below 60 GHz be made available to licensed and unlicensed operations. AT&T supported the proposed allocation of 59-64 GHz for general unlicensed devices and therefore opposes contrary proposals.[1]

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[1] The comments referenced in these reply comments and the abbreviations used to identify them are listed in the Appendix.

There is no dispute in the comments that licensed services using newly available millimeter wave frequencies will provide new and better communications capabilities to the people of the United States. The 40.5-42.5 GHz band drew most of the interest.

AT&T suggested two potentially valuable licensed uses of that band as an alternative to fiber: to connect PCS base stations to the public switched network and to provide transport within that network at SONET speeds. The first of those uses can be a key to making PCS affordable because low cost millimeter wave techniques can be used over distances of several kilometers, despite the fading impact caused by rain. The second suggested use would apply where a radio link would be more cost effective than fiber, such as for very short distances over terrain not conducive to laying fiber.

On the other hand, comments from Fixed Satellite Service ("FSS") interests urged that the proposed Local Multipoint Distribution Service ("LMDS") be placed in that band,[2] while LMDS interest opposed.[3] The point made by the FSS interests is that their proposed allocation to LMDS will solve the "impasse" between FSS and LMDS regarding the

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[2] GE Americom, Hughes, NASA, Rockwell, Teledesic, TRW.

[3] CellularVision.

possibility of sharing the 28 GHz band.[4] In addition, TIA and Harris urged that 40.5-42.5 GHz be allocated to LMDS so that the 28 GHz band could be allocated for fixed point-to-point microwave use, rather than to FSS.

AT&T does not intend to get into the middle of the dispute over the 28 GHz band. Possibly a sharing solution for that band can yet be developed. In any event, those parties failed to address other, more valuable, uses of the 40.5-42.5 GHz band, such as for connecting PCS base stations to the public network. PCS providers and the equipment manufacturers serving them will face the daunting challenge of creating a mass market service at costs lower than cellular, with lower powered terminals and in a band with weaker propagation characteristics. Clearly, PCS will use many more, but smaller, cells. Thus, PCS will need low-cost ways of connecting cell sites to the network in order for PCS to fulfill its potential as an alternative to wireline and cellular service.

In many situations, low-cost PCS backhaul will be achievable using fiber or coaxial cable. There will also, however, be many other situations where cable cannot be

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[4] Although this term is Rockwell's, other FSS interests also noted the unsuccessful efforts of the Commission's negotiated rulemaking committee to develop a sharing method. CellularVision claims that the FSS interests refused to negotiate in good faith (pp. 3, 9).

installed at a sufficiently low cost. Inexpensive millimeter-wave links can be the solution if sufficient spectrum is available. In AT&T's judgment, one GHz between 40.5 GHz and 42.5 GHz should be sufficient.[5]

The other contender for spectrum in the 40.5-42.5 GHz band is education. The Educational Parties recognize that it will take time and study to determine if demand for this technology to serve education "develops (or does not develop)." Nevertheless, they urge that one of those two GHz be reserved in each market for educational use.[6]

Even if the demand for millimeter wave spectrum for education purposes were clear, and it is not, the amount of spectrum sought by education interests is extremely excessive. Only GEC explains why one GHz of bandwidth is allegedly needed. That explanation, in terms of twenty-five 20 MHz channels for one-way delivery of programming and fifty 10 MHz point-to-point channels, is not convincing. Because the millimeter wave frequencies can be re-used over rather small geographic areas, AT&T suggests that one, or possibly a pair, of 50 MHz channels should be sufficient if the Commission is

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[5] Pacific, although supporting an allocation for "LMDS-like applications," urges "at least 1 GHz," rather than the entire two GHz, for that purpose.

[6] Accord: Clarendon; GEC. TSUM does not specify the "sufficient size" of the block to be reserved for education.

persuaded to set aside some 40.5-42.5 GHz spectrum for education.

AT&T proposed that the 40.5-42.5 GHz band be subdivided into paired blocks to facilitate duplex (two-way) transmission, specifically into twenty paired 50 MHz channels, with one channel in each half separated by one GHz. For example, the channel from 40.50 to 40.55 GHz would be paired with the channel at 41.50 to 41.55 GHz. AT&T also suggested that a licensee should be allowed to acquire two or three contiguous 50 MHz blocks. Those proposals would readily accommodate several PCS providers in each area and leave room for other service providers.[7]

The other service suggested by AT&T was transport within the public switched network at SONET speeds. The comments show that LMDS and educational services are other potential candidates. If each of five PCS providers acquired two of AT&T's proposed 50 MHz duplex channel pairs, that would leave ten paired 50 MHz channels available for other services.[8]

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[7] Of course, all services would have to comply with applicable limits on power and out-of-channel emissions.

[8] AT&T's 50 MHz channel proposal permits a large number of channels, each wide enough to accommodate a large variety of signals. Many different services can thus be offered in this band.

The benefits to the public of allocating millimeter wave frequencies to licensed services would be even greater if more of such spectrum were so allocated. Therefore, AT&T supports the proposal of H-P and mmWAG that the 48.2-50.2 GHz and 56-58.2 GHz bands, which the NPRM does not allocate at all, be allocated to licensed services. As H-P points out, emerging solid state technology will make it economically possible to use the 48.2-50.2 GHz band for delivery of broadband services, while the physical characteristics of the 56-58.2 GHz band make it well-suited for short range point-to-point links.

Another benefit of this proposal is that it creates a licensed band adjacent to the unlicensed allocation at 59-64 GHz. This allocation plan might make it possible to design devices that can be used both for licensed and unlicensed communications, affording customers greater economies and additional convenience. These same public interest objectives would be served by another aspect of the H-P and mmWAG proposal; namely, to allocate the 47.4-48.2 GHz band to general unlicensed devices, instead of to licensed services as proposed by the NPRM. This band is adjacent to the 48.2-50.2 GHz band which, as discussed above, should be allocated to licensed services.

In order to optimize the benefits of common devices across these boundaries between licensed and unlicensed

operations, both of those operations should be restricted to low power near the boundary, thereby supporting longer life for batteries in mobile and portable equipment. Any higher power operations should only be permitted at the end of the band furthest from the boundary.[9]

AT&T and other commenters[10] supported the proposal in the NPRM to make the 59-64 GHz band available to general unlicensed devices. The specific application mentioned by AT&T was computer-to-computer communications,[11] which is the use already provisionally recommended in Europe.[12] The Commission should reject the proposal of Japanese automotive interests[13] that the 60-61 GHz band be allocated to unlicensed vehicular radar systems. Those commenters did not dispute the recognition in the NPRM, supported by AT&T and others,[14] that vehicular radar systems must be separated from general

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[9] For example, in the 56-58.2 MHz licensed band, any authorized higher power should be confined between 56 and 57 MHz and low power required between 57 and 58.2 MHz. Correspondingly, in the 59-64 MHz unlicensed band, low power should be required between 59 and 62 MHz and any permitted higher power should be allowed only between 62 and 64 MHz.

[10] Apple; H-P; Metricom; mmWAG.

[11] Accord: Apple.

[12] CEPT Recommendation T/R 22-03.

[13] APMDU; Honda; Fujitsu; Mitsubishi; RCR; Toyota.

[14] E.g., EL; GM.

unlicensed devices. Thus, the Japanese proposal breaks the five GHz allocation for general unlicensed devices into two smaller, sharply less useful, segments. Strikingly, the American automobile manufacturers,[15] which made other proposals regarding frequencies for vehicle radar systems[16] did not seek the 60-61 GHz allocation proposed by the Japanese.

Finally, AT&T opposes EL's proposal that the entire unlicensed 59-64 GHz band, and for that matter any part of it, be allocated to spread spectrum devices. These devices were authorized by the Commission as overlays on existing uses under rules intended to prevent interference, thereby obtaining some additional use of the same spectrum.[17] It would, however, be spectrally inefficient to dedicate millimeter wave frequencies, where there are no pre-existing uses, to spread spectrum technology. Too much spectrum would be used to achieve too little, all for no reason.

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[15] AAMA; GM.

[16] AT&T does not comment on those proposals.

[17] Authorization of Spread Spectrum and Other Wideband Emissions Not Presently Provided For in the FCC Rules and Regulations, 101 FCC2d 419 (1985).

CONCLUSION

The Commission should make the 40.5-42.5 GHz band available for licensed services under rules permitting many different kinds of such services to operate, and should make the entire 59-64 GHz band available for general unlicensed devices. Moreover, there should be no restriction as to modulation method in any unlicensed band (i.e., spread spectrum devices would not be required, but would be permitted).

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APPENDIX

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Association for Promotion of Millimeter-Wave Development and Utilization - APMDU

CellularVision

Clarendon Foundation - Clarendon

Epsilon Lambda Electronics Corp. - EL

Fujitsu, Ltd. - Fujitsu

GE American Communications, Inc. - GE Americom

General Motors Corporation - GM

GHz Equipment Co., Inc. - GEC

Harris Corporation - Farinon Division - Harris

Hewlett-Packard Co. - H-P

Honda R&D Ltd. and Honda R&D North America, Inc. - Honda

Hughes Communications Galaxy, Inc. - Hughes

Metricom, Inc. - Metricom

Millimeter Wave Advisory Group - mmWAG

Mitsubishi Electric Corporation - Mitsubishi

National Aeronautics and Space Administration - NASA

Pacific Bell Mobile Services and Telesis Technologies Laboratory - Pacific

Research and Development Center for Radio Systems - RCR

Rockwell International Corporation - Rockwell

Teledesic Corporation - Teledesic

Fixed Point-to-Point Communications Section,
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Troy State University Montgomery - TSUM

TRW, Inc. - TRW

CERTIFICATE OF SERVICE

I, Janice Knapp, do hereby certify that on this 1st day of March, 1995, a copy of the foregoing "Reply Comments" of AT&T Corp. was mailed by U.S. first class mail, postage prepaid, to the parties on the following Service List.

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